EXHIBIT B

CURRICULUM VITAE

NAME: Joseph J. Barchi, Jr.

CITIZENSHIP: United States

MARITAL STATUS: Married, 2 children

EDUCATION:

1980 A.B. - Chemistry, Rutgers University, New Brunswick, New Jersey
1985 Ph.D. - Chemistry, University of Hawaii, Honolulu, Hawaii

POSITIONS HELD:

1981 - 1985 - Research Assistant, University of Hawaii, Honolulu, Hawaii (Richard E. Moore, Thesis Director)
1985 - 1987 - Research Associate, Duke University, Durham, North Carolina (Bertram O. Fraser-Reid)
1986 - 1987 - NMR Assistant Manager, Duke University, Durham, North Carolina
1987 - 1988 - Staff Fellow, Laboratory of Medicinal Chemistry, Division of Cancer Treatment, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
1988 - 1994 - Senior Staff Fellow, Laboratory of Medicinal Chemistry, Division of Cancer Treatment, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
1990 - date - Manager, NMR unit, Laboratory of Medicinal Chemistry, Division of Cancer Treatment, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
1994 - 1996 - NCI Cancer Expert, Laboratory of Medicinal Chemistry, Division of Cancer Treatment, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
1996 – 2001 - Permanent Staff Scientist, Laboratory of Medicinal Chemistry, Division of Basic Sciences, National Cancer Institute, National Institutes of Health, Bethesda, Maryland
2001-date – Senior Scientist, Laboratory of Medicinal Chemistry/Chemical Biology Laboratory/Molecular Discovery Program (2009), Center for Cancer Research, National Cancer Institute, Frederick, Frederick, Maryland

MILITARY SERVICE: None

PROFESSIONAL SOCIETIES:

American Chemical Society
American Society for the Advancement of Science
New York Academy of Science

AWARDS AND HONORS:

Dean's List - 4 years - Rutgers University
Henry Rutgers Scholar - Rutgers University
Graduated Cum Laude - Rutgers University
Departmental Research Fellow - University of Hawaii

November 29, 1994: Awarded Program of the Director AIDS Targeted Antiviral Research **Grant** for the structural studies of glycopeptides related to the V3 loop, $75,000. Renewed for **1995**, $40,000.

July 2009. Advance Technology Program Mini Grant, $5000 for cloning and expression of CKAP4

"New Voice in Chemistry", American Chemical Society, C+E NEWS, March 2001.

Elected Chair, Carbohydrate Gordon Research Conference, 2013.

Recent Invited Lectures

1. **Invited Lecture**, Gordon Research Conference on Carbohydrate Chemistry, June 17, 2001 Tilton, NH. *"Using Sugar Pucker to your Advantage in the design of Nucleosides and Polynucleotides"*.

2. **Invited Lecture** Hunter College, New York, NY, Dec 2001. *"Conformationally Restricted Nucleosides: What can they tell us about protein binding and DNA topology?*

3. Cambridge Healthtech Institute **Triconference on Molecular Medicine**, March 23-26, 2004, San Francisco, Ca. **Best Poster**, $500.

4. **Invited Lecture**: Cambridge Healthtech Institute conference on Glycomics, Cambridge, MA, May 5-6, 2003 *"Glyconanotechnology: Construction and Properties of Sugar/Peptide-Bearing Nanoparticles"*.

5. **Invited Lecture**: Cambridge Healthtech Institute conference on Glycomics, April 26-27, 2004. *"Sugar-Coated Nanoparticles: Novel Scaffolds for the Study of Glycan and Glycopeptide-Mediated Processes".*

6-8. **Three Invited Lectures**: Animal Models Initiative, Bioimaging Branch, and Frederick Faculty Seminar, NCI, NIH. Late May-Early July 2004. *"Sugar-Coated Nanoparticles: Novel Tools as Potential Antimetastatics and Bioimaging Agents.*

9. **Invited Lecture**: International Carbohydrate Symposium, Glasgow, Scotland, July 25, 2004. *"Carbohydrate Nanoparticles: Novel Multivalent Scaffolds for the Study of Glycan and Glycopeptide-Mediated Processes "*

10. **Invited Lecture**: 229th American Chemical Society National Meeting, March 13, 2005. Part of the **"Frontiers in Carbohydrate Chemistry"** Symposium in honor of Jacques van Boom, Alexei Demchenko, organizer. *"Carbohydrate nanoscience: A new realm for biochemical and therapeutic applications "*

11. **Invited Lecture**, Gordon Research Conference on Carbohydrate Chemistry, June, 2005 Tilton, NH. *"Progress in the Synthesis and Evaluation of Nanoparticles Coated with Tumor-Associated Carbohydrate Antigens".*

12. **Invited Lecture**, Seton Hall University Department of Chemistry, Sept 2005. *Progress in the Synthesis and Biological Applications of Sugar Coated Nanoparticles".*

13. **Invited Lecture**, University of Toledo, Department of Chemistry, Oct 2005. *"Glyconanotechnology as a Means to New Cancer Diagnostics and Therapeutics"*

14. **Invited Lecture**, 230th American Chemical Society National Meeting, San Francisco, Ca., September 2006. *Structural Studies of Biologically Interesting Fluorinated Nucleosides.*

15. **Invited Lecture,** Benzon Symposium on Glycosylation: Opportunities in Drug Development, Copenhagen, Denmark. June 2007. Do Carbohydrate Coated Nanoparticles Have Antitumor Therapeutic Potential

16. **Invited Lecture,** Wayne State University, Department of Chemistry, September, 2007. *Sugars, Peptides and Particles: Can We Mix and Match Them for Novel Strategies to Treat Cancer?.*

17. **Invited Lecture**, Midwest Carbohydrate Symposium, October 2007. *Sugars, Peptides and Nanotech: A Winning Combination for Anticancer Research?*

18. **Invited Lecture**, McGill University, Department of Chemistry, March 2008. *Sugars, Peptides and Nanotech: A Winning Combination for Anticancer Research?*

19. **Invited Lecture**, University of California, Davis Department of Chemistry, April 2008. *Sugars, Peptides and Nanotech: A Winning Combination for Anticancer Research?*

20. **Invited Lecture**, Glycoscience Research Day, NIH May 2008. *"Gold Glyco(peptide)nanoparticles: An Update*

21. **Invited Lecture**, workshop on "Future Directions of Multivalent Agents In Therapeutic Development", sponsored by NIGMS, May 2008.

22. **Invited Lecture**, Center for Advanced Research in Biotechnology, University of. Maryland, *"Use of NMR to Study Conformational Bias in Small Bioactive Molecules"*.

23. **Invited Lecture**, Translational Medicine Branch Seminar Series, NIDDK, NIH. June 2008. *"Sugars, Peptides and Nanoparticles: A Winning Combination in Anti Cancer Research?"*

24. **Invited Lecture**, American Chemical Society, 237th National Meeting, Salt Lake City, UT. *Sugar/peptide nano-constructions as anti-tumor therapeutics and vaccine platforms*

25. **Invited Lecture,** American Society of Pharmacognosy, June 2009, "*Studies of the Antiproliferative Factor from Interstitial Cystitis Patients and its Potential as an Anticancer Agent".*

25. **Invited Lecture**, University of Missouri, St Louis, Oct 2009. *"New Approaches to Anticancer Drug Discovery and Immunotherapy: Gold Nanoparticles meet Tumor-Associated Carbohydrate/Glycopeptide Antigens".*

26. **Invited Lecture**, Southern Illinois University at Edwardsville, Oct 2009, *"New Approaches to Anticancer Drug Discovery and Immunotherapy: Gold Nanoparticles meet Tumor-Associated Carbohydrate/Glycopeptide Antigens".*

27. **Invited Lecture**, University of Maryland, College Park, November 2009"*New Approaches to Anticancer Drug Discovery and Immunotherapy: Gold Nanoparticles meet Tumor-Associated Carbohydrate/Glycopeptide Antigens".*

28. **Invited Lecture**, Glycobiology Interest Group, Johns Hopkins University, December 2009, *"Structure/Activity Studies of APF: A Glycopeptide Antiproliferative Factor from Interstitial Cystitis Patients"*

29. **Invited Plenary Lecture**, NIH Glycobiology Interest Group Glycoscience Day, May 2010, *"Novel Multivalent Presentations of the Thomsen Friedenreich Tumor Associated Carbohydrate Antigen: Implications for Therapeutic Design".*

30. **Invited Lecture**, 240th ACS Annual meeting, Boston MA, Aug 2010, *"New Glycopeptide-Based Nanoparticle Constructions for Anticancer Therapy"*.

Teaching Experience: Developer and instructor of **Foundation for Advanced Education in the Sciences, NIH** Course: Chem 327: *"The Art of Drug Discovery and Design"*, 2 credits, Spring, 1999-date.

Guest Editor: *Current Topics in Medicinal Chemistry*, on The Art of Drug Design and Discovery, Vol. 1, issue 3, **2002**.

Editorial Board Member: *Current Cancer Drug Targets* and *Carbohydrate Research*

Synthesis and Biological Chemistry Study Section, Center for Scientific Review, NIH, *Ad Hoc member*, February 2007 and June 2008. Asked to serve as permanent member starting October 2009

Biological Chemistry and Macromolecular Biophysics Special Emphasis Panel/Scientific Review Group 2010/01 ZRG1. Reviewer, Nov 2009

Peer Review: Many Journals including, *J. Med. Chem., Carbohydr. Res., J. Am. Chem. Soc., Biochemistry, ACS Nano, Magnetic Resonance Chem., J. Org. Chem., Biorg. Med. Chem. (and Lett.), Nano Lett., Several for National Science Foundation*

Patents

1. Marquez, V.E.; Driscoll, J. S.; Ford, H.; Kelley, J. A., **Barchi, Jr., J. J**.; Mitsuya, H.; Tseng, C. K-H.; Johns, D. G. and Tomaszewski, J. E. Lipophilic Aminohydrolase-Activated Prodrugs. U. S. Patent 5,459,256, **1995**.

2. Marquez, V.E.; Rodriguez, J.B.; Nicklaus, M. C.; **Barchi, Jr. J. J**. and Siddiqui, M. A. Conformationally Locked Nucleosides Analogues, U.S. Patent # 5,869,666, **1999**.

3. **Barchi, J. J. Jr.** and Svarovsky, S.; Biofunctionalized Quantum Dots for Biological Imaging. DHHS No. E-325-2003/0-PCT-01, Submitted November 5th, 2003,

4. **Barchi, J. J. Jr.** and Svarovsky, S., Carbohydrate-Encapsulated Quantum Dots for Biological Imaging. DHHS No. E-133-2004/0-US-01, Submitted March 22, 2004.

5. **Barchi, J. J. Jr.,** Rittenhouse-Olson, K and Svarovsky, S.; Carbohydrate Antigen-Nanoparticle Conjugates and Methods for Inhibiting Metastasis in Cancer. NIHA-0183 filed October 28th, 2004.

BIBLIOGRAPHY

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2. **Barchi, J.J.**; Norton, T.R.; Furusawa, E.; Patterson, G.M.L.; Moore, R.E. Identification of a Cytotoxin from Tolypothrix byssoidea as Tubercidin. Phytochemistry, 22, 2851, **1983**.

3. Knapp, S.; Trope, A.F.; Theodore, M.S.; Hirata, N.; **Barchi, J.J**. Ring Expansion of Ketones to 1,2-Keto Thioketals. Control of Bond Migration. J. Org. Chem., 49, 608, **1984.**

4. **Barchi, J.J**.; Moore, R.E.; Patterson, G.M.L. Acutiphycin and 20,21 Didehydroacutiphycin. New Antineoplastic Agents from the Cyanophyte Oscillatoria acutissima. J. Amer. Chem. Soc., 106, 8193, **1984**.

5. Moore, R.E.; **Barchi, J.J**.; Bartolini, G. Use of Borate Complexation in Assigning Relative Stereochemistry of Acyclic Polyhydroxylated Compounds. J. Org. Chem., 50, 374, **1985**.

6. Ainslie, R.D.; **Barchi, J.J**.; Kuniyoshi, M.; Moore, R.E.; Mynderse, J.S. Structure of Malyngumide C. J. Org. Chem., 50, 2859, **1985.**

7. Moore, R.E.; Patterson, G.M.L.; Mynderse, J.S.; **Barchi, J.J.**; Norton, T.R.; Furusawa, E.; Furusawa, S. Toxins from Cyanophytes Belonging to the Scytonemataceae. Pure and Appl. Chem., 58, 263, **1986**.

8. Fraser-Reid, B.; Wolleb, H.; Faghih, R.; **Barchi, J.J**. Avermectin Chemistry: Problems of Conjugation, Deconjugation and Epimerization. J. Amer. Chem. Soc., 109, 933, **1987**.

9. Fraser-Reid, B., **Barchi, J.J. Jr**., Faghih, R. Avermectin Chemistry II: A Secure and Flawless Strategy for the Final Synthetic Stages. J. Org. Chem., **1988**, 53, 923.

10. Marquez, V.E.; Driscoll, J.S.; Tseng, C.K-H.; **Barchi, Jr., J.J**.; Kelley, J.A.; Johns, D.G.; Mitsuya, H. Acid-Stable Purine Dideoxynucleosides Active Against the Cytopathic Effects of Human Immunodeficiency Virus. U. S. Patent 7,288,652, Filed December 12, **1988**.

11. **Barchi, J.J., Jr**., Marquez, V.E., Driscoll, J.S., Ford, H., Mitsuya, H., Shirasaka, T., Aoki, S. and Kelley, J.A. Potential CNS Anti-AIDS Drugs. Lipophilic Adenosine Deaminase Activated Prodrugs. J. Med. Chem., **1991**, 34, 1647-1655.

12. Wysocki, Jr., R.J., Siddiqui, M.A., **Barchi, Jr., J.J**., Driscoll, J.S., Marquez, V.E. A More Expedient Approach to the Synthesis of anti-HIV active 2',3'-dideoxy-2-fluoro-β-D-threo-pentofuranosyl nucleosides. Synthesis, **1991**, 1005-1008.

13. Driscoll, J.S., Marquez, V.E., Plowman, J., Liu, P.S., Kelley, J.A., **Barchi, Jr., J.J.** Antitumor Properties of 2-Oxopyrimidine Riboside (Zebularine) and its Fluorinated Analogues. J. Med. Chem., **1991**, 34, 3280-3284.

14. Teng, K., Marquez, V. E., Milne, G. W. A., **Barchi, Jr., J. J**., Kazanietz, M. G., Lewin, N. E., Blumberg, P. M., Abushanab, E. Conformationally Constrained Analogues of Diacylglycerol. Interaction of γ-Lactones with the Phorbol Ester Receptor of Protein Kinase C. J. Am. Chem. Soc., **1992**, 114: 1059-1070, .

15. **Barchi, Jr., J.J**., Musser, S.M., Marquez, V.E. The decomposition of 1-(β-D-ribofuranosyl-1,2-dihydropyrimidine-2-one (zebularine) in alkali: Mechanism and Products. J. Org. Chem., **1992**, 57, 536-541.

16. Siddiqui, M.A.; Driscoll, J.S.; Marquez, V.E.; Roth, J.S.; Shirasaka, T.; Mitsuya, H.; **Barchi, Jr., J.J**.; Kelley, J.A. Chemistry and anti-HIV properties of 2'-fluoro-2',3'-dideoxyarabinofuranosyl pyrimidines. J. Med. Chem. **1992**, 35, 2195-2201.

17. Russ, P.L., Hegedus, L., Kelley, J.A., **Barchi, Jr., J.J**., Marquez, V.E. The Controlled Stereospecific Reduction of Cyclopentenyl Cytosine (CPE-C) to Carbodine and Isocarbodine. Nucleosides & Nucleotides, **1992**, 11, 351-363.

18. **Barchi Jr., J.J.**; Haces, A.; Marquez, V.E.; McCormack, J.J. Inhibition of cytidine deaminase by derivatives of 1-(β-D-ribofuranosyl)-dihydropropyrimidin-2-one (Zebularine). Nucleosides & Nucleotides, **1992**, 11, 1781.

19. Marquez, V.E.; Lim, B.B.; **Barchi, Jr., J.J.**; Nicklaus, M.C. Conformational studies and anti-HIV activity of mono- and difluorodideoxy nucleosides. In Nucleosides and Nucleotides as Antitumor and Antiviral Agents, Chu, C.K. and Baker, D.C., Eds, Plenum Press, New York, 1993.

20. Bodenteich, M.; Marquez, V.E.; **Barchi Jr., J.J.**; Hallows, W.; Goldstein, B.M.; Driscoll, J.S. Synthesis of Carbocyclic Analogues of 1-β-D-Psicofuranosyl Nucleosides. Psicocyclopentenyladenosine (Psicoplanocin A) and Psicocyclopentenylcytosine. J. Org. Chem., **1993**, 58, 6009-6015.

21. Rodriguez, J.B.; Marquez, V.E.; Nicklaus, M.C.; **Barchi, Jr., J.J.** Synthesis of Cyclopropane-fused Dideoxycarbocyclic Nucleosides Structurally Related to Neplanocin C. Tetrahedron Lett., **1993**, 34, 6233-6236.

22. **Barchi Jr., J.J.**; Grasberger, B.L.; Gronenborn, A.; Clore, G.M. Investigations of the Backbone Dynamics of the IGg Binding Domain of Streptococcal Protein G by Heteronuclear Inverse Detected ^{1}H-^{15}N Nuclear Magnetic Resonance Spectroscopy. Protein Science, **1994**, 3, 15-21.

23. Gharehbaghi, K.; Paull, K.D.; Kelley, J.A.; **Barchi, Jr., J.J.**; Marquez, V.E.; Cooney, D.A.; Monks, A.; Scudiero, D.; Krohn, K.; Jayaram, H.M. Biological and Biochemical Characterization of Benzamide Riboside, a New Inhibitor of IMP Dehydrogenase. Int. J. Cancer, **1994**, 56, 892-899.

24. Siddiqui, M.A.; Marquez, V.E.; Driscoll, J.S.; **Barchi Jr., J.J.** A diastereoselective synthesis of (S,S)-α-fluoro-2,2-dimethyl-1,3-dioxolane-4-propanoic acid methyl ester, a key intermediate for the preparation of anti-HIV effective fluorodideoxynucleosides. Tetrahedron Lett., **1994**, 35, 3263-3266.

25. Rodriguez, J.B.; Marquez, V.E.; Nicklaus, M.C.; Mitsuya, H.; **Barchi, Jr. J.J.** Conformationally Locked Nucleosides Analogues. Synthesis of Dideoxycarbocyclic Nucleoside Analogues Structurally Related to Neplanocin C. J. Med. Chem., **1994**, 37, 3389-3399.

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